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INTRODUCTION TO THE LAW LIBRARY CD-BASED MULTIMEDIA PACKAGE

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Abstract

This project, Introduction to the Law Library, is a CD-based multimedia package which main objective is to provide information about the library to the new law students during orientation week. This proposal provides an overview about the development of this package.

Literature reviews provide ideas and enable developers to have a clearer picture in developing a system. For this project, review has been done on multimedia development, development strategy, authoring tools, similar packages, and others library web pages. From the findings, lots of information for developing this project was obtained and the results were all shown in the chapter two of this proposal.

The System Development Life Cycle is chosen as the development strategy for this project by using the Macromedia Director 7 authoring tool.

Once this project is developed, it consists of features such as background and history, location, floor plan and operation hours, library collection, library facilities, services, memberships, and rules and regulations, information on CD-ROM database and introduction to Opac System, as well as borrowing, returning and booking procedures, and the fine system according to different kinds of memberships.

University of Malaya

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University of Malaya

TABLE OF CONTENTS

University of Malaya

University of Malaya

CHAPTER FIVE: SYSTEM IMPLEMENTATION

CHAPTER SIX: SYSTEM TESTING

University of Malaya

University of Malaya

LIST OF FIGURES

University of Malaya

INTRODUCTION

University of Malaya

1.1 Introduction to Project

"An academic library is defined as a library forming an integral part of a university, college, or other academic institution for post secondary education, organized and administered to meet the information need of students, faculty and affiliated staff in the institution" (Young, 1983). Library resources include both print and non-print materials which are own by the library for providing information to the learners or students.

Since its establishment, the Tan Sri Professor Ahmad Ibrahim Law Library in the University of Malaya has grown over the years to become the largest and most well developed law library in this country. With the most comprehensive collection, the library is rich in its primary and secondary law sources, covering virtually every jurisdiction from the Commonwealth countries and United States. All these sources are divided into distinct groups such as the Malaysian Collection, Reference Collection, Statutes, Reporters, International Law Collection and Reserve Collection. The 29th of October 1998 marked an important date for the library where it proudly has its own building next to the Law Faculty in the Sultan Azlan Shah Building.

Librarians have the responsibility of introducing the law library to the new law students every year during orientation week. The main purpose of this is to let the students have a clearer picture of the usage of the library together with its general rules and regulation as well as the facilities provided by the library. Students will be taken around the library and information related will be delivered out manually by the librarians to the students.

Information delivering is increasingly becoming a vital part of our society, especially in this rapid growing information technology era. Thus, information delivering styles are changing, bringing a demand for a more innovative and flexible methods of delivering information. Multimedia, though is quite a new application, is widely accepted and known as an effective propaganda in delivering information.

Multimedia has extended the areas in which computers are used. Where computers were previously used mainly to support work tasks, multimedia applications may be used for diverse purposes such as entertainment, education, commerce, communications and even art (Shaw, 1997). Multimedia is an elegant way to integrate text, graphics, video, animation and sound in giving users a rich visual, auditory and interactive experience in the information delivering process.

With the launched of the Multimedia Super Corridor (MSC) project, the usage of multimedia is becoming more and more popular in Malaysia, especially in the Information Technology industry. For example, multimedia is used in the production of advertisement, movies, and also used by companies that provide information and services to the public. With the combination of graphic, audio, video, animation and text, multimedia can captured the attention of users and thus increase the user's ability to absorb the information being delivered.

This 'Introduction to Law Library" package proposed in this report is a project to create an attractive, interesting and interactive CD package using a chosen software development tool, Macromedia Director 7. The goal of this

University of Malaya

project is to provide information about the Law Library to the students during their orientation week.

1.2 Project Objectives

The objectives of developing this project are as follows:

- To develop a package that provides information on the usage of the Law Library to the students during orientation week.
- To replace the manual information delivering process with an interactive and interesting way that will capture the student attention throughout the viewing process.
- To provide a further reference tool on library usage to the students.
- To learn the usage of multimedia authoring tools in developing a presentation package for delivering needed information in a fast, easy, simple, effective and user-friendly way.
- To implement the concept to create an interactive multimedia application to increase the understanding and impact of the information presented to students.
- To self-organized the development of a project within the time-frame provided.
- To maximize the usage of the available technology, sources, hardware and software tools in order to develop this project.

University of Malaya

1.3 Project Scope

The final implementation of the project which is CD-ROM based will cover the scope of information as listed below :

- Background and history of the Law Library.
- Location of library.
- Library collection.
- Library public facilities
- Floor plan of library.
- Operation hours of library.
- Services provided by the library.
- Different kinds of available membership.
- Rules and regulations of the library usage.
- CD-ROM database.
- Introduction to OPAC system.
- Borrowing procedure of library resources based on membership.
- Booking procedure of library resources.
- Returning procedure of library resources.
- Fine system based on the membership and resources borrowed.

1.4 Project Significance

The challenge in developing multimedia application is to ensure that they are not only visually pleasing but also usable. Currently, the responsibility of

University of Malaya

delivering information about the law library is done manually by the librarians during orientation week. Librarians will be taking the students on a tour around the library, telling them related information based on their own knowledge and experience. Different librarians will present differently. The main focus of this multimedia package is to standardized the information being presented in an interesting and eye-catching way.

From this package, students will be able to get basic information about the rules and regulations of the usage of law library, history and background of the library, facilities provided to its users, brief introduction to OPAC system in searching for information and some other related information which is important in order to use the library effectively.

Delivering information in the multimedia way has more impact and the students can absorbed the information easily and effectively. This is because the combination of graphics, text, sound and animations create a visually powerful effect on the screen and are effective in delivering the information.

This package is not only useful to students but also serves as a reference source for new librarians who want to do further enhance information about the law library.

With ample usage of images, graphics and animations which requires a large storage, CD-ROM based solution is chosen as the most suitable storage for this multimedia package. The CD can be stored easily and viewed repeatedly. It can also be easily retrieved.

Another significance of this project will be its relevance to the rapidly developing information technology scenario in Malaysia. With the launching of the MSC project by our Prime Minister, Dr. Mahathir Mohammad, multimedia application is one of the main priority. Emphasis is given on the integration of the usage of text, sound, graphic, animation and video in delivering information.

The development of this project also has its impact and significance to me. It would help me to learn how to develop a multimedia package using the selected available authoring tool which I have never used before. Additionally, it will also increase my knowledge of multimedia development methods.

1.5 Project Limitation

The Introduction to Law Library package has a limitation to it. This package is merely a basic information guide about the library. Information provided would be enough to assist the students in accessing the law library's vast collection.

Further detailed information is not provided to the students. Therefore, the students would still have to refer to the reference librarian for their queries and doubts.

University of Malaya

LITERATURE REVIEW

University of Malaya

2.1 Purpose of Literature Review

Literature review is a background study of the related knowledge and information collected to develop this project. The main purpose of this literature review is to get a better understanding of which software development tools are available in the market and can be used to develop this project. Review on articles of available software authoring tools and multimedia applications will provide a better view of this project. Besides, it is also aimed at providing more knowledge on the methodologies used to develop this project.

It would also enable the developer comparing on similar projects and have an insight of the strengths and weaknesses of the project. Through this way, the developer will get an idea of how to improve the project and fulfill the requirements needed.

2.2 Approach

In the broadest sense, a system is a collection of elements interacting together to accomplish some purposes and systems are all around us (Senn, 1989). Different systems can be developed in different approaches using different tools. Before developing a system, a lot of research has to be carried out to gathered all the related information about the system itself, the procedures as well as the methodologies involve in developing the system. All these information are obtained from various sources, either from print materials, other similar packages or electronic sources. Print materials include articles, journals, newspaper, books, magazines, reports, etc.

University of Malaya

Each source will provide different information depending on the analysis of the developer himself. It depends on the ability of the developer to analysis the information to extract the most useful information out of it.

In the development of the Introduction to Law Library Multimedia Package project, numerous articles on multimedia development were used as a guide and to gain information on how to develop the project. A package developed for the University Malaya Main Library was used as a basis for developing a similar package for the law library.

Information on the law library will be collected from the librarians before the implementation stage.

Research was done on the Internet to gather information from various sites on the software development authoring tools that are available in the current market. Comparison is made to select the best authoring tools that is suitable for this project.

The search engines that were used to search for information include Yahoo, Lycos, Altavista, Hotbot, Excite search and MSN.

In other words, most of the findings for this project are gathered from the World Wide Web (WWW), articles in newspaper, magazines and books. The result of this research on literature review has set a foreground for the development of this project.

University of Malaya

2.3 Findings

All the information gathered for this project can be divided into few sources, printed resources, electronic resources and similar past-developed package. Following are all the findings in detail.

2.3.1 Review on Multimedia Development

From the users perspective, multimedia applied when information is represented through a combination of audio and/or video, text, image, graphics and animation. The availability of multimedia hardware and software components has driven the enhancement of existing applications towards being more user-friendly (known as re-engineering) and has initiated the continuous development of new multimedia applications (Steinmetz & Nahrstedt, 1995).

One of the most claimed benefits of multimedia is an increased naturalness of interaction where this naturalness can stem from different sources (Peterson, 1998). New types of media combinations can improve naturalness through an increase depth in the information that is being presented to the user. This allow the users to take advantage of the ability to attend to more than one stimulus at a time (Alty, 1991)(Bearne, Jones & Sapsford, 1994). Furthermore, some argue that redundancy, either in terms of multiple output media or multiple input devices, can make interaction more natural (Marmolin, 1991).

Researchers have several concerns when deciding which medium is most appropriate in a particular context. These considerations include the type and

quality of the information, the need for later retrieval of the information, and the users' knowledge of the problem domain. In general, projects whose requirements are mainly text and graphics based, and whose audience are online (e.g. students in University) may well served by creating a WWW site. However, projects that require access to large data files (e.g. with lots of high resolution images, audio and animations) with a higher degree of customized interactivity are often better suited to a CD-ROM based solution (Tamblyn, 1996).

A CD consists of a plastic-coated metal disc, on which binary digital information is stored in the form of microscopic pits. This can be then read optically by passing a laser bean over the disc. Typically, it can hold up to 650 megabytes of data, and are used in distributing large amount of text, graphics, audio, and video, such as encyclopedias, catalogues, technical manuals, and games. As for this reason, the Introduction to Law Library package has chosen to be developed into a CD based for its final result.

The distinct human senses have different priorities. Multimedia application uses human sensitivity in increasing the communication skills. From a survey carried out, human sensitivity can be seen from the way human perceive information. It can be divided to three main parts, 20% through hearing, 40% through hearing and sighting, 75% through hearing, sighting and attitude. As can be seen from the statistic above, if the strength of new media are used appropriately, multimedia applications can be easier to use, more engaging and fun, easing navigation and act as a effective way in delivering information (Peterson, 1998).

Librarians have always had a problem explaining to others and to themselves just what it is they do, why it is valuable and why they consider their work "professional" (Gaffney, 1989). This has even strengthen the reason to develop this introduction package so that student can absorbed the same information in a faster and effective way.

Listed down below are some sites that provide some of the useful articles on multimedia development :

- Link to lots of articles on multimedia application and development. (http://www.acm.org/crossroads/doc/indices/features.html#Multimedia)
- Article on Towards Usability Evaluation of Multimedia Applications. By Marianne G. Peterson. (http://www.acm.org/crossroads/xrds4-4/usability.html)
- Index to Multimedia Information resources. (http://dutiem.twi.tudelft.nl/projects/MultimediaInfo/)
- Multimedia Educational Materials. (http://www.cs.cornell.edu/Info/Faculty/bsmith/mmsyl.htm)
- Librarians in Search of Science & identity : The Elusive Profesion. (http://kramer.ume.maine.edu/~jmb/jmb47.html#abstract6)
- Abbreviation for CD-ROM (http://dknet.lineone.net/dictionaryof/computers/m002593.html)

University of Malaya

2.3.2 Review on Development Strategies

As computer is used more and more by people who are not computer professionals, the face of systems development is taking on an additional dimension. Users themselves are undertaking development of some of the systems they use, as the executive in the vignette emphasized.

There are three systems development strategies : the classical system development life cycle method, structured analysis development method, and the systems prototype method. All three development strategies are in widespread use in organizations of all types and sizes, and each is effective when properly used (Senn, 1989).

2.3.2.1 Systems Development Life Cycle

The systems development life cycle (SDLC) method is classically thought of as the set of activities that analysts, designers, and users carry out to develop and implement a system. In other words, the SDLC is a phased approach to analysis and design which holds that systems are best developed through the use of a specific cycle of analyst and user activities (Kendall & Kendall, 1998). This method consists of seven different phases :

- Identifying problems, opportunities, and objectives
- Determination of system requirements
- Analyzing system needs
- Designing the recommended system

- Development and documenting software
- Testing and maintaining the system
- Implementing and evaluating the system

Several of these activities may be going on concurrently since different parts of the system may vary in their degree of completion.

2.3.2.2 Structured Analysis Development Method

Many information systems specialists acknowledge the difficulty of fully understanding large, complex systems. The structured analysis development method is aimed at overcoming that difficulty through partitioning the system into components and constructing a model of the system. It consists of elements of both analysis and design.

Structured analysis focuses on specifying what the system or application is required to do. It does not state how the requirements should be accomplished or how the application should be implemented. Rather, it allows individuals to see logical components it uses (what the system should do) apart from the physical components it uses (computers, terminals, storage systems, etc.). Later a physical design can be developed that will be effective for the situation in which it is to be used.

Essential elements of structured analysis include graphic symbols, data flow diagrams and a centralized data dictionary.

University of Malaya

Graphic models show details of the system without introducing manual or computer processes, tape or disk files, or program and operating procedures. Instead of words, symbols or icons are used to create a graphic model of the system. If the right symbols and notation are selected, virtually anyone can follow the way components in the system fit together.

Data flow diagrams (DFD) show the flow of data into the system and between processes and data stores. In preparing the model, the analyst emphasizes what occurs, not how it is accomplished. Thus, the focus is on logical, rather than physical aspects of the system.

Structured design, another element of structured analysis that utilizes graphic description, focuses on the development of software specifications. The goal of structured design is to create programs consisting of functionally independent modules that perform relatively independently of one another. The fundamental tool of structured design is the structure chart. Like data flow diagrams, structure charts are graphic and avoid specification of hardware or physical details. They describe the interaction between independent modules and the data passing between modules that interact with one another.

2.3.2.3 Systems Prototype Method

The systems prototype method involves the user more directly in the analysis and design experience than does the SDLC or structured analysis method.

A prototype is a partially developed product that enables users to examine some aspect of proposed system and decide if it is suitable or appropriate for the finished product. In other words, prototyping means building a small version of a system, usually with limited functionality, that can be used to help the users identify the requirements of a system and demonstrate feasibility of a design or approach. Although the prototype is a working system, it is designed to be change easily.

In general, systems analyst find prototypes to be most useful under the following conditions :

- No system with the characteristics of the one proposed has yet been constructed by the developers.
- The essential features of the system are only partially known; others are not identifiable even through careful analysis of requirements.
- Experience in using the system will significantly add to the list of requirements the system should meet.
- Alternate versions of the system will evolve through experience and additional development and refinement of its features.
- The system user(s) will participate in the development process.

2.3.3 Review on System Authoring Tools

When developing a multimedia application, the developer or designer is faced with many different possibilities of presenting the same information. The final presentation method chosen will ultimately depend on the target audience,

University of Malaya

the budget allocated to the production and the content of the title (Mai & Neo, 2000).

Authoring tools are packages that enable developers to create a final application that is interactive in navigation and media-rich in content. It is a program which has pre-programmed elements for the development of interactive software titles and are vary widely in orientation, capabilities, and learning curve. Some knowledge of heuristic thinking and algorithm design is essential in using the authoring tools. Authoring tools is actually a speeded-up form of programming where you don't need to know the intricacies of a programming language, but just the need to understand how the programs work (Jasiglar, 1999).

Multimedia applications are previously developed using programming languages. However, nowadays, the trend is rapidly changing where the used of authoring tools will reduce or eliminate the need to do a lot of programming. This has been a major help to multimedia enthusiasts who want to venture into the field of interactive multimedia development but may not have a background in authoring.

Authoring tools are preferred over programming language in developing multimedia application because of a few main factors. As we know, authoring tools are display oriented rather than data oriented and can create a lot of effects and larger numbers of different screen formats. Requirements of minimum knowledge of programming language enable it to be developed faster.

Besides, listed down below are some advantages of using authoring tools:

- Ability to do fast prototyping.
- Ease of expanding the prototype to a full system.
- Ease of use.
- Built in multimedia capabilities.
- Less need in programming expertise.

Authoring paradigm, also known as authoring metaphor, is the method used by the authoring system to accomplish its task. There are various paradigms as listed:

- Scripting Language

  Authoring method closest in form to the traditional programming where the paradigm is a programming language which specifies multimedia elements, sequencing, hotspots, synchronization, etc. A powerful, object-oriented scripting language us usually the centerpiece of such a system. Scripting languages do vary; check out how much the language is object-oriented or object-based. The scripting language paradigm tends to need longer development time but generally create more powerful interactivity.

- Iconic/Flow Control

  This tends to be the fastest authoring style and best suited for rapid prototyping and short-development time projects. Many of these tools are also optimized for developing Computer Based Training (CBT). The core of the paradigm is the Icon Palette, containing the functions/interactions of the program, and the Flow Line, which shows

University of Malaya

the actual links between the icons. These programs tend to be the slowest runtimes, because each actual interaction carries with all of its permutations; the higher end packages, such as Authorware or IconAuthor, are extremely powerful and suffer least from runtime speed problems.

- Frame

  The Frame paradigm is similar to the Iconic/Flow Control paradigm where it usually incorporates an icon palette, the links drawn between icons are conceptual and do not always represent the actual flow of the program. This is a very fast development system, but requires a good auto-debugging function, as it is visually un-debuggable.

- Card/Scripting

  This paradigm provides a great deal of power but suffers from the index-card structure. It is best suited for Hypertext applications, and extremely suited for navigation intensive applications. Such programs are easily extensible via XCMDs and DLLs and are widely used for shareware applications. The best applications allow all objects to be scripted; many entertainment applications are prototyped in a card/scripting system prior to compiled-language coding.

- Cast/Score/Scripting

  This paradigm uses a music score as its primary authoring metaphor; the synchronous elements are shown in various horizontal "tracks" with simultaneity shown via the vertical columns. The true power of this metaphor lies in the ability to script the behavior of each cast members. The most popular member of this paradigm is Macromedia Director, which is used in the creation of many commercial

applications. These programs are best suited for animation-intensive or synchronized media applications.

- Hierarchical Object

  This paradigm uses an object metaphor (like OOP) which is visually represented by embedded objects and icon properties. Although the learning curve is non-trivial, the visual representation of objects can make very complicated constructions possible.

- Hypermedia Linkage

  This paradigm is similar to the Frame paradigm where it shows conceptual links between elements. However, it lacks the Frame paradigm's visual linkage metaphor.

- Tagging

  This paradigm uses tags in text files (eg:SGML/HTML) to link pages, provide interactivity and integrate multimedia elements.

Research has been carried out on the authoring tools available in the current market. Listed below are the result of the review of the authoring tools:

- Astound (Astound)

  Astound, currently in its 6.0version is a venerable frame paradigm authoring system, which has added extensive interactivity to its presentation origin.

  (http://www.astound.com/products2/astound/astound.html)

- Auraline (NEC System Laboratory)

University of Malaya

Auraline is a cast/score/scripting authoring tool, oriented to produce interactive presentations. It is one of the first generation of Java authoring tools.

(http://www.auraline.com/about/about.htm)

- Authorware Attain (Macromedia)

  Currently in its version 5.0, this follows the iconic/flow control paradigm with a limit per individual file of 32,000 icons. Authorware supports jumping between files, jumping out to applications and even printing from them. This has unparalleled external media support, and can encapsulate all non-motion media content into applications and content libraries, or leave media files external for dynamic access. Authorware supports character-styled text and extensive navigation structures including hypertext. This tool is optimal for CBT and rapid prototyping.

  (http://www.macromedia.com/software/authorware/)

- BigEx (Warren-Forthought, Inc)

  This is an iconic/flow control tool for interactive multimedia presentation construction, including instructional design for CBT programs.

  (http://www.mockingbird.com/products/bigex/index.htm)

- CourseBuilder (Discovery System International)

  CourseBuilder 5.0 is an iconic/flow paradigm authoring tool optimized for CBT delivery. Allow scriptless interactive courseware construction.

  (http://www.disciverysystems.com/Pages/CB-Soft.HTML)

University of Malaya

- Digital Chisel 3 (Pierian Spring)

  Digital Chisel 3 has been rewritten in Java for delivery to most platforms. It has moved from its card paradigm to frame paradigm. It has a user-friendly interface, clean design and customizable levels for school.

  (http://www2.pierian.com/products/authoring_tools/digital_chisel3/dc3.htm)

- Director 7.0 (Macromedia)

  This popular general market product follows the cast/score/scripting paradigm, which makes it the main tool of choice for animation content. Its roots as a cel- sprite-animation program with the inclusion of Lingo, its object-based scripting language, has made it the animation-capable program applications.

  (http://www.macromedia.com/sofrware/director/)

- Docent (Docent)

  Docent, now in version 3.0 is a HTML Enterprise Training authoring tool, the tool uses both an outliner metaphor and a tool palette, can be considered as a cross between an iconic/flow control tool and a hierarchical object paradigm system.

  (http://www.docent.com/solutions/products/index.htm)

- Everest Authoring System (Intersystem Concepts, Inc)

  Everest is a Hypermedia Linkage paradigm authoring tool; it uses a hierarchical Book/Page/Object metaphor, with multiple palettes and windows for Attributes, Variables, Layout, etc. The A-pex scripting

University of Malaya

language has extensive online help via the A-pex3 Assistant wizard and standard Windows API calls (such as MCI, WinHelp, ActiveX) are supported.

(http://www.insystem.com/creator.htm)

- Flash (Macromedia)

  Flash 3.0 is a cast/score/scripting tool, which primarily uses vector graphics. It is optimized for web delivery, and is especially common for banner ads and small interactive web deliverables.

  (http://www.macromedia.com/software/flash/contents-fla.html)

- Formula Graphics Multimedia System (Formula Software Pty Ltd)

  This is a Hypermedia Linkage authoring system, whose interface is more than vaguely reminiscent of Visual Basic; has a relatively powerful scripting language.

  (http://www.formulagraphics.com)

- Hyperguide 1.1 (Lakewood Software)

  This is a multimedia and internet authoring tool for Mac featuring integrated indexing, searching and bookmarking support. Design online documentation and text-intensive multimedia titles, including online help, image portfolios and hyperscript titles. Include built in support for QuickTime VR, speech synthesis, URL, and links.

  (http://www.lakewoodsoftware.com/)

- HyperStudio 3.3 (Roger Wagner Publishing)

This is a card/scripting paradigm authoring tool, optimized and focussed on the educational market.

(http://www.hyperstudio.com/KA/status_7_00.html)

- IconAuthor (Asymetrix)

  IconAuthor follows the iconic/flow control paradigm. It is notable for its Smart Object editor, which tags content files for interactivity. It has the option of either embed content files or leave them external in specifies directories. The biggest strength of this paradigm is its included data handling, which makes it unparalleled for CBT data tracking.

  (http://www.asymetric.com/kbsearch/showart.html)

- MediaForge (Clearsand Corporation)

  This is a frame paradigm authoring tool with a scripting language (MediaBasic) that is similar to Visual Basic. The current version features multiframe sprites and enhanced transparency and it also allows the creation of templates for runtime editing.

  (http://www.clearsand.com/webpages/prod/mf/index.htm)

- Motivate (Motion Factory)

  Known as an "Intelligent Character" authoring tool, this is a fantastic 3D Hierarchical Object authoring system optimized for character generation.

  (http://www.motion-factory.com/products/frameset_products.html)

- Multimedia Fusion (IMSI)

Formerly Corel's Click and Create, this frame paradigm authoring tool is one of the easiest tool to learn.

(http://www.imsisoft.com/nbw.html)

- Quest 6 (Allen Communications)

  Quest 6 for Windows is a frame paradigm authoring system. Its most notable feature is its scripting language, which is ANSI C.

  (http://www.allencomm.com/software/quest/)

- Realimination STE (Realimination)

  The Realimination Space-Time-Editor is a 3D Virtual Reality authoring tool.

  (http://www.realimination.com/overview/ste.htm)

- Scala MM200 (Scala)

  MM200 is a frame paradigm authoring tool with an emphasis on interactive presentation authoring. It includes support for most Windows-based mulimedia content formats and has a large bank of available transitions.

  (http://www.scala.com/mm/index.html)

- Special Delivery 2.1E (IMC)

  A multimedia authoring tool that allow users to easily create powerful presentations and interactive multimedia projects without the use of scripting, timelines or other complex interfaces.

  (http://www.imcinfo.com/MasterMMauthoringtools.html)

University of Malaya

- SuperLink (Alchemedia)

  SuperLink is the successor software to Linkway, and follows the card/scripting paradigm, while holding the content externally to the script file.

  (http://www.alchemedia.com/stfeatr.html)

- ToolBook II (Asymetrix)

  ToolBook II is a card/scripting authoring tool which now broken into components : Instructor, the standard tool; Assistant, the pre-built templates; CBT Systems, optimized for CBT production; and CMS Plus, a course management system. Toolbook includes database linkage, MCI compliance and many examples of interactivity. This newest version exports HTML and Java for Web delivery.

  (http://www.asymetrix.com/products/intructor.html)

- Xpower (Paul Mace Software)

  Xpower is a scripting paradigm authoring system in a full-fledged IDE where it enables you to view your program as a flowchart or on a visual stage.

  (http://www.pmace.com/xpower.htm)

2.3.4 Review on Similar Package

University Malaya Main Library has created a similar introduction package about the library. This half an hour information presentation package was created using the Microsoft PowerPoint authoring tool.

The information is presented in bahasa melayu language. The package is a combination of text, audio and images and graphics. It contains merely any animation. All the images used were scanned pictures of the library.

The package starts with the introduction to the main library, delivering the information on the background and history of the library. Then, it introduced the general rules and regulations of the library and the student usage of the library. Next, it also introduced the facilities and services provided by the library. Later, the package delivered the information in a tour-style, where audience will be taken around each section of the library, together with the information of each department of the printed material and related information (such as usage and borrowing rules of the material) being presented out.

From my point of view, this package can be made more interesting with some added animations and attractive graphical design. The idea of the touring around the library is interesting and will bring an impact to the students who view it. However the impact will be stronger if the multimedia concept is used more widely.

2.3.5 Review on Libraries Web Pages

Review has been carried on some others library web pages in order to research on the information that are included in these sites. Below are some sites being reviewed :

- Law Library of Congress

  URL : http://lcweb2.loc.gov/lawweb/public/htdoc/law006.html

This site was found from the Lycos search engine by using the keywords "law + library". This is the site created for the Law Library of Congress.

The site was created to facilitate the use of its users, either in the library itself or online. It contains the law library home page which links to all its sub page, welcome page which includes the speech of a law librarian, information about the library and update news that relate to the library. Besides, it also includes the information about the collection of the library as well as the guide to use the services available. A map to show the location of the library is posted up as well.

It also contains a frequently asked questions page to guide the users regarding the problems they encountered.

This site gives an idea of what kind of information to be included in the development of this project.

- University of Malaya Library

  URL : http://www.umlib.um.edu.my

  This is the site for the Main Library of University Malaya. It has an brief introduction about the library, including the mission, history and the development of the library.

  The page has a library system where it links the other major library in the university, such as the Law Library and the Medical Library

Za'ba Memorial Library and some other minor libraries in each faculty. From here, users can access the library online catalog, OPAC, to look for the resources available among the vast collection of the library.

Users can access the Online Library Information Service for online renewal, mailing document, online databases, general resources and internet resources by subject.

Information about references, loans, membership, services, recent publications, and opening hours are included to facilitate the users queries about the library.

Furthermore, it also provides the MalaysianaWeb which is a searchable online Directory of Malaysiana Internet Resources, Conferences database and books.

Overall, this is an informative site created with sparse images and graphics which enable fast loading time.

- University of George Washington Marian Gould Gallagher Law Library
  URL : http://lib.law.washington.edu/

This site was found from the Altavista search engine by using the keywords "law + library". University of George Washington maintain this site.

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This is a well-developed site with comprehensive information to guide the users about the library usage. It has a site search engine to enable users to search for the needed information.

The main page links to others pages such as internet legal resources, legal research guides, research services, references and publications. Created on text-based with few images and graphics, this is a user-friendly and descriptive site.

- Georgetown University Edward Bennett Williams Law Library
  URL : http://www.ll.georgetown.edu/

This site was found from the Altavista search engine by using the keywords "law + library". Georgetown University maintain this site.

The information provided include the reference assistance, interlibrary loan, library collections, readings, research guides, library usage guide and most frequent asked questions. Besides, a virtual tour around the library is created with pictures of each section of the library together with the related information. Thoroughly,Users will have a better view of the library.

This site links to other law related web sites which can be categorized under federal, state, local, foreign and international stage. It also has a list of periodicals research such as the guide to legal journals and general periodicals.

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.4 Summary

All this research was done in order to gain information for developing this ›roject. Aspects covered in the research are review on multimedia development, ;ystems development strategy, multimedia authoring tools, similar packages and)thers libraries web pages.

As for the development strategies, the review focuses on the two main development models that are the waterfall model which refer to the SDLC, the prototyping model, and the structure analysis development method. Each model has its own features and advantages, which are different from one another. There is no rules in using what methods to develop a system. it depends on when they are used, how they are applied, and who is involved in the development process. The development method that has been chosen for this project will be discussed in the following chapter.

The information gathered on the authoring tools was analyzed and the tool chosen for this project will also be discussed in the next chapter. Most of this information was obtained from the Internet.

As for the review on the similar packages, information was obtained from the main library which has a introduction package developed earlier. Ideas were gained on how to develop this project after viewing the similar package.

The others libraries web pages also provide an idea on what kind of information to include in the development of this project. It also gives a view of how the information flow in the project.

That summarizes the literature review for this project. All the information ɔbtained will be used effectively and efficiently for the development of this ɔroject.

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SYSTEM ANALYSIS

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3.1 System Analysis

System analysis is the process of gathering and interpreting facts, diagnosing problems and using the information to recommend improvement to the system. Through system analysis, we may add, delete and modify the system components to improve the overall system. The information gathered during this phase has provided alternatives strategies to develop this system

Objectives of the analysis:

- To identify what are the actual need of the user.
- To identify the major modules to be included in the project.
- To acquire knowledge on how this project will be developed with the current emerging technology.
- To identify the hardware and software requirements.

3.1.1 Identifying Objectives for Project

Before developing a system, it is very important to identify the objectives of developing the system. The developer must find out the main purpose of developing the system and what is the goal to achieve in the outcome of the system.

This project, "Introduction to the Law Library" is going to be a CD-based information package for new law students during their orientation week. It consists of related information about the library to enable students to have a better understanding of the usage of the library.

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3.1.2 Determining Information Requirements

In developing a system, it is very important to determine the information requirements for the system. A lot of information is needed in order to identify the requirements. In the development of this project, information was gathered through research and interviews. Research for this project was done on the books, journals, WWW and similar multimedia package. The results of this research were described in the literature review in Chapter Two. An interview with Ms. Ratnawati, the librarian in the law library and a few law students were carried out to gather information on the expectations of the outcome of the introduction CD. This interview was conducted to learn the needs of the information to be delivered to the new law students. The results of the interview showed that the students would like to have the following features in the introduction CD:

- Informative
- Simple and easy to understand
- Attractive and interesting interface
- Considerable viewing time (not exceed 1 hour)
- More graphic and audio information rather than textual presentation
- Easy storage and retrieval
- Well organized

3.1.3 Requirements for Project

Here, the needs of the users of this system are defined. The broad outline and technology used in the system development will also be defined. After analyzing the gathered information, the requirements for this project was outlined separately into functional requirements and non-functional requirements. Functional requirements means the way the system and its environment interact. In other words, it explains what the system will do. Non-functional requirements describe restrictions on the system that limits the choices for constructing a solution to the defined problem. These requirements constrain the behavior in terms of reliability, usability, manageability and user-friendliness.

i) Functional Requirements:

- Provides information to the students on the usage of the law library.
- Apply the multimedia concept in the project development using a selected authoring tool.
- Create an interactive multimedia package with the combination of image, graphic, audio, video and animation.

ii) Non-functional requirements:

- Reliability

  Reliability is the extent to which a system can be expected to perform its intended function with required precision and accuracy.

- Usability

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The package should be developed in a way that it is easy to use. Users should be able to retrieve the needed information easily.

- User friendliness

  An appropriate menu hierarchy will give the users an overall view of the system. User friendly interface is important to help the users to use the system confidently and easily.

3.2 Approach in Development

A development method must be chosen in order to develop a system or to make a project successful. In the literature review section, three approaches were studied. There is no one right way to develop a system, some methods are more successful than others, depending on when they are used, how they are applied, and who is involved in the development process (Senn, 1989).

It is very important to have this strategy, as it will help the developer to organize the project. Every system development needs the user to determine the requirements that later describe the system. A requirement is a feature every new system should have, including both the information the system should produce and operational features such as processing controls, producing information, controlling a business activity, supporting the management, response times, and input and output methods. The determination of requirements thus entails studying the existing system and collecting details about it to find out what these requirements are (Senn, 1989). There are four

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main methods by which requirements about a system can be obtained. There are reading, interviewing, observation and questionnaires (Millington, 1981).

After analyzing these approaches, the system development life cycle (SDLC) was chosen for this project. The approach is described below:

3.2.1 System Development Life Cycle Method (SDLC)

The SDLC is a phased approach is classically thought of as a set of activities that analysts, designers, and users carried out to develop and implement a system. Some application characteristics of the SDLC strategy :

- Predictable systems requirements.
- Manageable as a project.
- Long development timetable.
- Development by project teams.
- Requires entry of data into files and databases.
- High transaction and processing volume.
- Requires validation of data input.

3.2.2 Seven Phases of SDLC

This section examines each of the seven activities that make up the SDLC, as shown in Figure 3.1. Although each phase is presented discretely, it is never accomplished as a separate step. Instead, several activities can occur

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simultaneously, and activities may be repeated (Kendall & Kendall, 1998). This is shown in the dotted line in the figure.

- Identifying Problems, Opportunities, and Objectives

  This stage is critical to the success of the project. It requires the analyst to look honestly at what is occurring, and what is the objectives of the system to be developed. Activities in this phase consist of interviewing user management, summarizing the knowledge obtained, estimating the scope of the project, and documenting the results. The output of this phase is a feasibility report containing a problem definition and the project objectives.

- Determining Information Requirements

  In this phase the analyst is striving to understand what information users need to perform their jobs and determine information requirements for the particular users involved. Among the tools used to define information requirements are sampling and investigating hard data, reading, interviewing, questionnaires, observing decision maker behavior and environments and even prototyping. Questionnaires are used to collect information from large groups of people who cannot be interviewed individually. Detailed investigations also require the research on related information, study of manuals and reports, actual observation of work activities, and, sometimes collection of samples of forms and documents to fully understand the process. The analysts study the gathered information to identify features the system should have, including the information the system should produce. At the completion of this phase, the analysts should

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understand the system functions and have complete information on the people, goals, data, and procedures involved.

- Analyzing System Needs

In this stage, the system analyst involves in analyzing the system. Tool that is widely used in this phase is the data flow diagrams. Data flow diagram is used to chart the input, processes, and output of the system's functions in a structured graphical form. From the data flow diagrams, a data dictionary is developed that lists all of the data items used in the system, as well as their specifications. During this phase the system analysts also analyze the structures decisions made. Structured decisions are those for which the conditions, condition alternatives, actions, and action rules can be determined. There are three major methods to analyze the structured decisions: structured English, decision tables, and decision trees. Tool(s) used to develop the system is decided in this phase as well. At this point, the system analyst prepares a system proposal that summarizes what has been found, provides cost/benefit analyses of alternatives, and makes recommendations on what should be done. The development will be continued if the recommendation is accepted.

- Designing the Recommended System

In this phase, the system analyst uses the information collected earlier to accomplish the logical design of the system, in contrast to the process of developing program software, which is referred to as physical design. Part of the logical design of the system is devising the user interface. The interface connects the user to the system and is thus extremely important. The design

phase also includes designing files or databases needed by the system. Analyst must also design controls and backup procedures to protect the system.

- Developing and Documenting Software/System

  In this phase of the SDLC, the analyst works with the programmers to develop any original software that is needed. Some of the structured techniques for designing and documenting software/system include structure charts, Nassi-Shneiderman charts, and pseudocode. During this phase the analyst also works with users to develop effective documentation for system that tells users how to use the system and what to do if problems occur.

- Testing and Maintaining System

  During systems testing, the system is used experimentally to ensure that the software does not fail, for example, that it will run according to its specifications and in the way users expect. It is preferable to discover any problems before the system is implemented for real use. Maintenance and documentation of the system begin in this phase and is carried out throughout the life of the system.

- Implementing and Evaluating the System

  In this last phase of the SDLC, the analyst helps implement the system. This involves training users to handle the system. Evaluation is concerned with reviewing the new system after it has been implemented for a while to see how well it is working. Actually, evaluation takes place during every phase in the SDLC.

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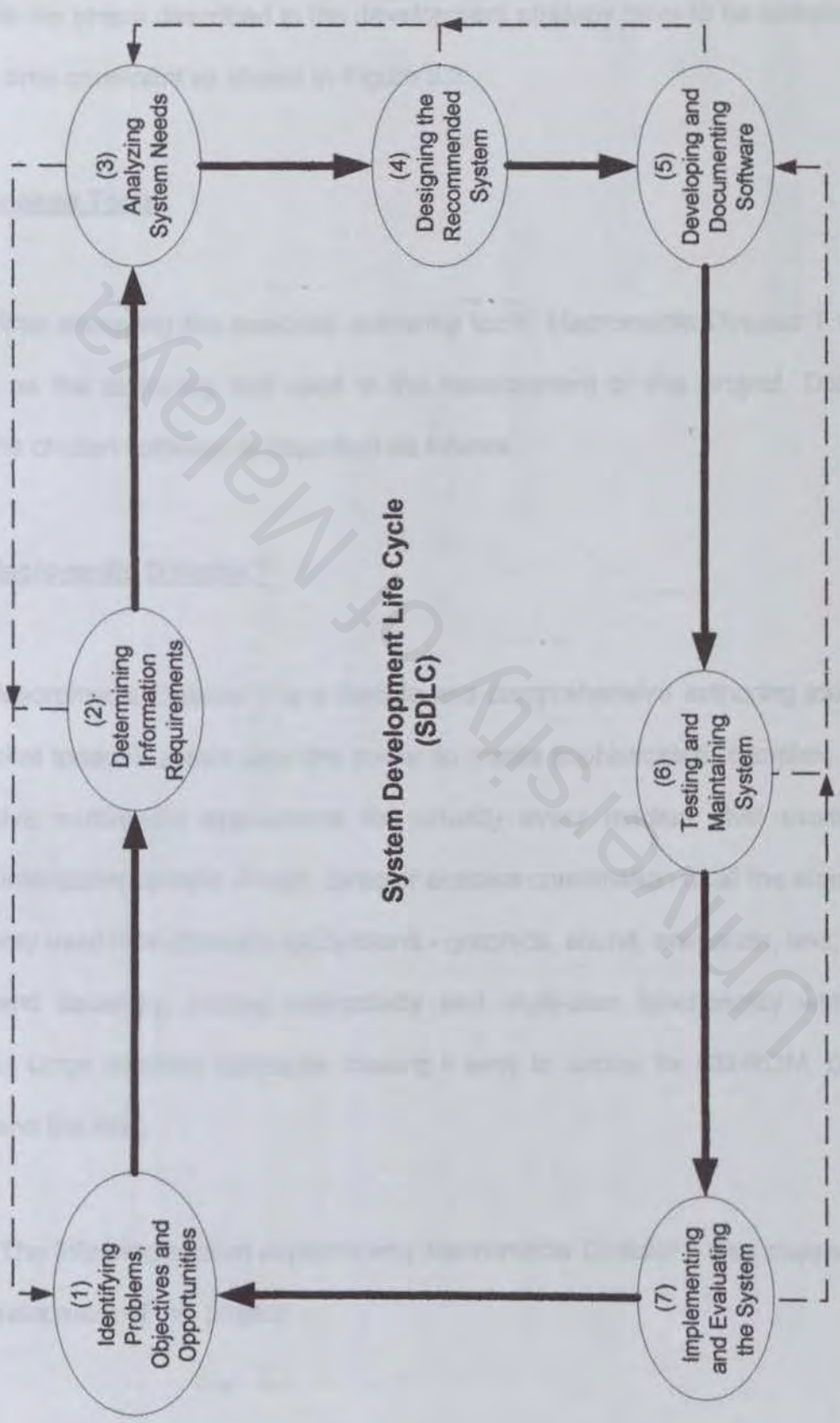
Figure 3.1: Steps in System Development Life Cycle



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3.3 Project Schedule

All the phase described in the development strategy have to be completed within a time constraint as shown in Figure 3.2.

3.4 Proposed Tools

After analyzing the available authoring tools, Macromedia Director 7 was chosen as the authoring tool used in the development of this project. Details about the chosen software is described as follows:

3.4.1 Macromedia Director 7

Macromedia Director 7 is a flexible and comprehensive authoring tool on the market today. It allows user the power to create sophisticated, complex, and interactive multimedia applications for virtually every medium that exists to deliver interactive content. Firstly, Director enables combination of all the element commonly used in multimedia applications - graphics, sound, animation, text, and video and secondly, adding interactivity and multi-user functionality with its powerful Lingo scripting language, making it easy to deploy for CD-ROM, DVD-ROM, and the Web.

The following section explains why Macromedia Director 7 was chosen for the development of this project:

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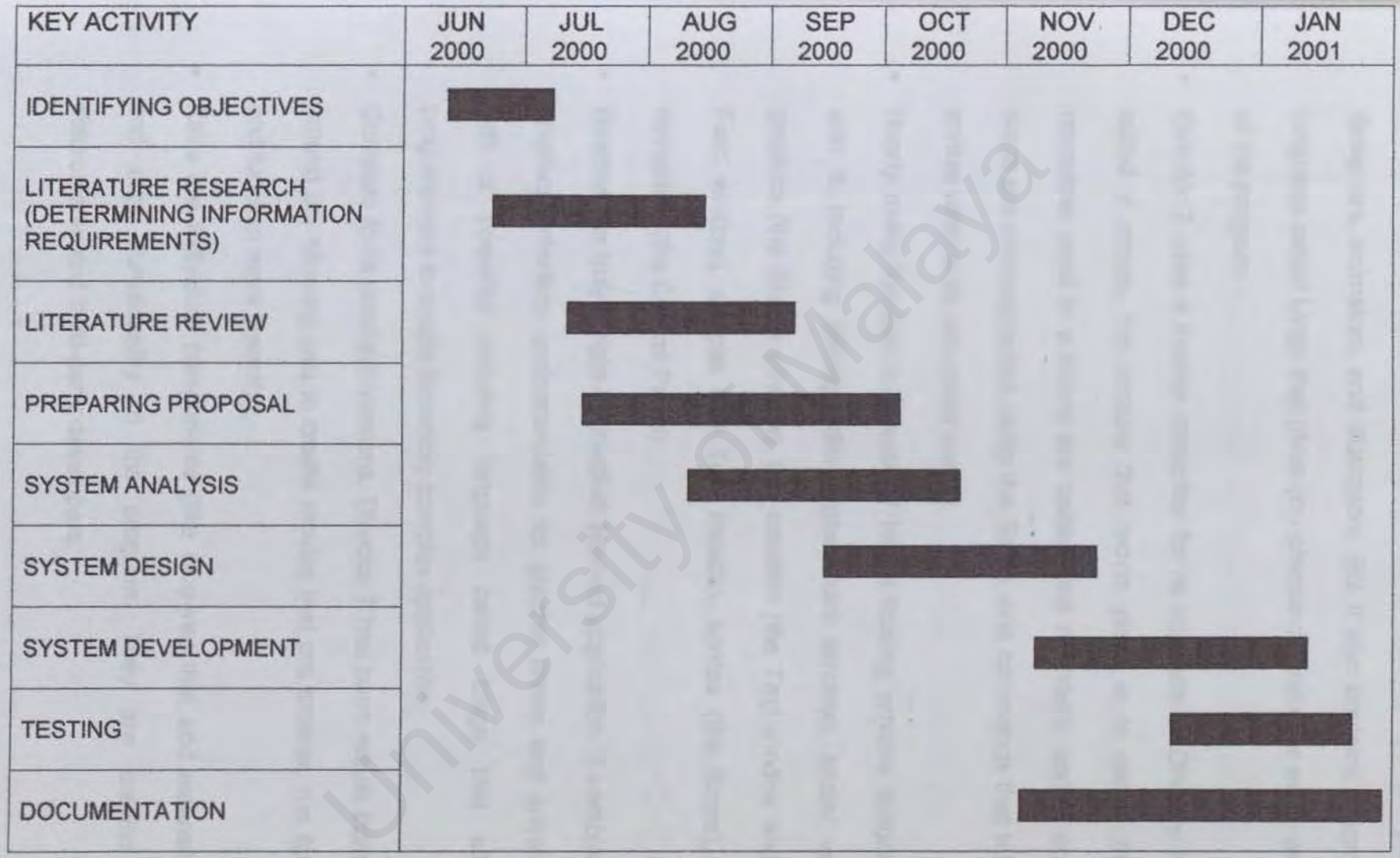

Figure 3.2 : Gantt Chart shows the starting and ending period for each activity in the project.

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- Director 7 is graphics oriented, making it an ideal tool for graphic designers, animators, and illustrators. But it also contains a scripting language called Lingo that gives you precise control over every aspect of the program.
- Director 7 uses a theater metaphor for its interface. A Director file is called a *movie*, the window that movie plays in is called *Stage*, resources used in a movie are called *Cast members*, *sprites* on the stage are choreographed using the *Score*, and commands that tell the sprites what to do are called *scripts*.
- Nearly every function in Director 7 has a floating window associated with it, including bitmap editing (the Paint window), bezier vector graphics (the Shape window), text creation (the Text window and the Field window), shapes (the Tool Palette), sprites (the Score), and navigation (the Control Panel).
- Director 7 is truly a right-brained/left brained application. It combines a graphical interface understandable for graphic artists and animators with a powerful scripting language called Lingo that allows programmers to create incredibly complex application.
- Compare to its previous versions, Director 7 has been rebuilt from the ground up, allowing you to create movies that are smaller, run faster, and function more smoothly.
- Xtras are individual components (like plug-ins) that add extensibility and extra functionality to the program. They are created by Macromedia and third-party developers.

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- Director 7 has a context-sensitive Help engine as well as a comprehensive Web site that make it easier both to learn how to use the program and to keep up to date with the most recent features.
- Director 7 provides built-in tools for creating richly formatted text and bitmapped graphics. The new Vector Shape window provides a FreeHand-like pen tool for drawing bandwidth-and memory-friendly shapes, complete with control points and optional solid-color or gradient fills. It also automatically antiliases vector shapes and user can control every property of a vector shape using Lingo scripts.
- Director 7 has better support for GIF and JPEG. Imported GIF and JPEG files are stored with their original compression, providing smaller file sizes and faster download times.
- Animated GIFs can be imported, enabling user to control how many times the animation loops and when it plays. Fonts can be embedded and distributed with movies. Text that has an embedded font applied to it can be edited while the movie is playing and during the authoring process on any platform.
- The new built-in behaviors contained in the new Library palette enable you to create complex multi-user applications, such as chat rooms, games, and collaborative learning environments, without having to be an advanced Lingo programmer.

3.4.2 Others Proposed Tools for System Development

Apart from the Macromedia Director 7, listed below are the softwares used in the process of the system development:

3.4.2.1 Adobe PhotoShop 5.0

Adobe Photoshop 5.0 software delivers a basic set of the image-editing tools preferred by graphic design professionals around the world. It has been used to design, modify, and improve the pictures and images before they are included in the project. Scanned pictures or downloaded photos are edited and enhanced using the features in Photoshop 5.0 to create sophisticated, compelling visuals for print, presentation and the Web. This software not only makes the alteration and repair of photos quick and easy, but also gives users hundreds of professionally designed templates for instantly creating multi-purpose images.

Photoshop 5.0 also provide tools which enables users to precisely adjust the brightness, contrast, and color in an image without losing details of the image, retouch and restore photos with darkroom-style tools, create dazzling artwork with more than 95 filters and sophisticated layering controls, and use powerful selection and masking tools to quickly isolate areas of an image users want to modify.

3.4.2.2 Microsoft Paint

Microsoft Paint is a program that can be used to draw and paint designs and annotate the designs with text. Drawings made in Paint can be inserted into other programs. Paint has a toolbox to draw pictures using built-in shapes such as rectangles, polygons, circles, or ellipses, or by using a "pencil" or "spray-paint

can" to draw original shapes. Shapes can be outlined or filled-in with different colors and text can be inserted anywhere on the drawing.

3.4.2.3 Microsoft PhotoEditor 3.0

Microsoft PhotoEditor 3.0 is used in editing the scanned photos before the photos are imported into Director 7. Some of the most widely used features in PhotoEditor 3.0 are such as resizing and cropping the image and adjusting the brightness and contrast of the image.

3.4.2.4 Ulead COOL 360

Ulead COOL 360 is a surprisingly powerful program that takes a simple series of photos and turns them into an immersive 3D panoramic experience. It enables developer to quickly and easily transform a series of photos into 360° panoramic scenes or images for multimedia presentation, delivery via e-mail, the Web or in MS Office documents. COOL 360 has an intuitive interface and an easy-to-use Wizard that delivers great-looking panoramas fast. Plus, you get advanced photo stitching, warping, aligning and blending tools to ensure excellent results. Share your finished panoramas via email as an .exe file (includes Ulead Panorama Viewer), save them on your web site or insert them into documents and presentations as still images.

Ulead Cool 360 is used in the system development to create a virtual tour of the ground floor of the Law Library. The finished product will be included as a part of the project and is viewed by using the QuickTime 3.0.

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3.4.2.5 Cool Edit 2000 (by Syntrillium Software Corporation)

Cool Edit 2000 is a audio recording software which enable users to record their own music, voice or other audio, edit it, mix it with other audio or musical parts, add effects like Reverb, Chorus, and Echo to it, equalize it, and master it so that users can burn it to a CD, use it in an interactive multimedia presentation, post it on the World Wide Web, or email it. Best of all, users don't have to be an expert to use Cool Edit 2000. It's so easy to use that even if you're a novice, you can start producing great recordings in just minutes.

Cool Edit 2000 supports different formats of files such as .mp3, .wav, .pcm, and .aiff.

3.4.3 Hardware Requirements for Project

- An Intel Pentium 90 or equivalent processor running Windows 95, 98, or NT version 4.0 or later
- 32MB of RAM minimum
- A 15-inch, 8-bit color monitor supporting a minimum of 256 colors at 640.480 resolution
- QuickTime 3.0 or later
- A double-speed or faster CD-ROM drive to install Director and play the developed CD
- 16-bit sound card
- 4Mb SVGA Video card
- Mouse (PS II or Serial – Depends on PC)

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- Speaker
- Microphone for audio recording
- A CD-writer to burn the developed-package
- A CD-R to store the developed-package

3.5 Conclusion

Creation of an interactive multimedia presentation involves the integration of software and hardware components. It also involves many other important feature that has to be taken into consideration such as user capability and background knowledge. In this project, the selection of the most suitable authoring tools for the development process is a critical decision that has impact on the flexibility of design, resource requirement, ease of development and ability to integrate various resources.

Compatibility with other existing and proposed design may be an issue. However, each multimedia project should be accessed with regards to identified objectives, target audiences, delivery capabilities, availability of skills and maintenance aspects throughout the developed system.

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SYSTEM DESIGN

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4.1 System Design

System design is the evolution of alternative solutions and the specification of a computer based solution. The task of system design is to take the description and associate a specific set of facilities with it – human, machines (computing and other), accommodation, etc. – to provide a complete specification of a workable system (Millington, 1981). In other words, it is a creative process of transforming the problem into a solution and the description of the solution.

Generally, system design is an iterative process of two important stages, which are the conceptual design and the technical design. The conceptual design indicates to the users what the system will perform. When the users have satisfied and approved the conceptual design, then the design phase will automatically move into a more detailed document called technical design. The documents generated enable the developers to understand the hardware and software required to solve the users' problems.

4.2 System Design for Project

In the development of this project, the system design has been divided into two phases, the content design and the screen design.

This project is designed based on the structured design technique. Structured design is a process-oriented technique for breaking up a large system

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into a hierarchy of structure chart of modules that result in a structure chart that simplified the understanding of the whole system.

Structure chart is a treelike diagram. The modules in the structure chart are depicted by named rectangles. Modules are factored from top-down into sub modules. Figure 4.1 shows the structure chart flow of the main menu for the project after integration. Users should be able to link all the different sections in the module easily during the viewing process.

4.2.1 Content Design

The content design is related to the selection of information to be included into the project. Here, the content to be included into the project can be divided into five parts. Listed below are the five parts of the content together with its related information:

- Introduction
  - Brief introduction to the Law Library
  - Operation Hours
  - Staffing
  - Briefly on Law Library Collection
- Facilities & Services
  - Facilities provided by Law Library
  - Services provided by Law Library
  - Law Library Publishing
- Each Floor
  - Virtual Tour of Law Library Ground Floor

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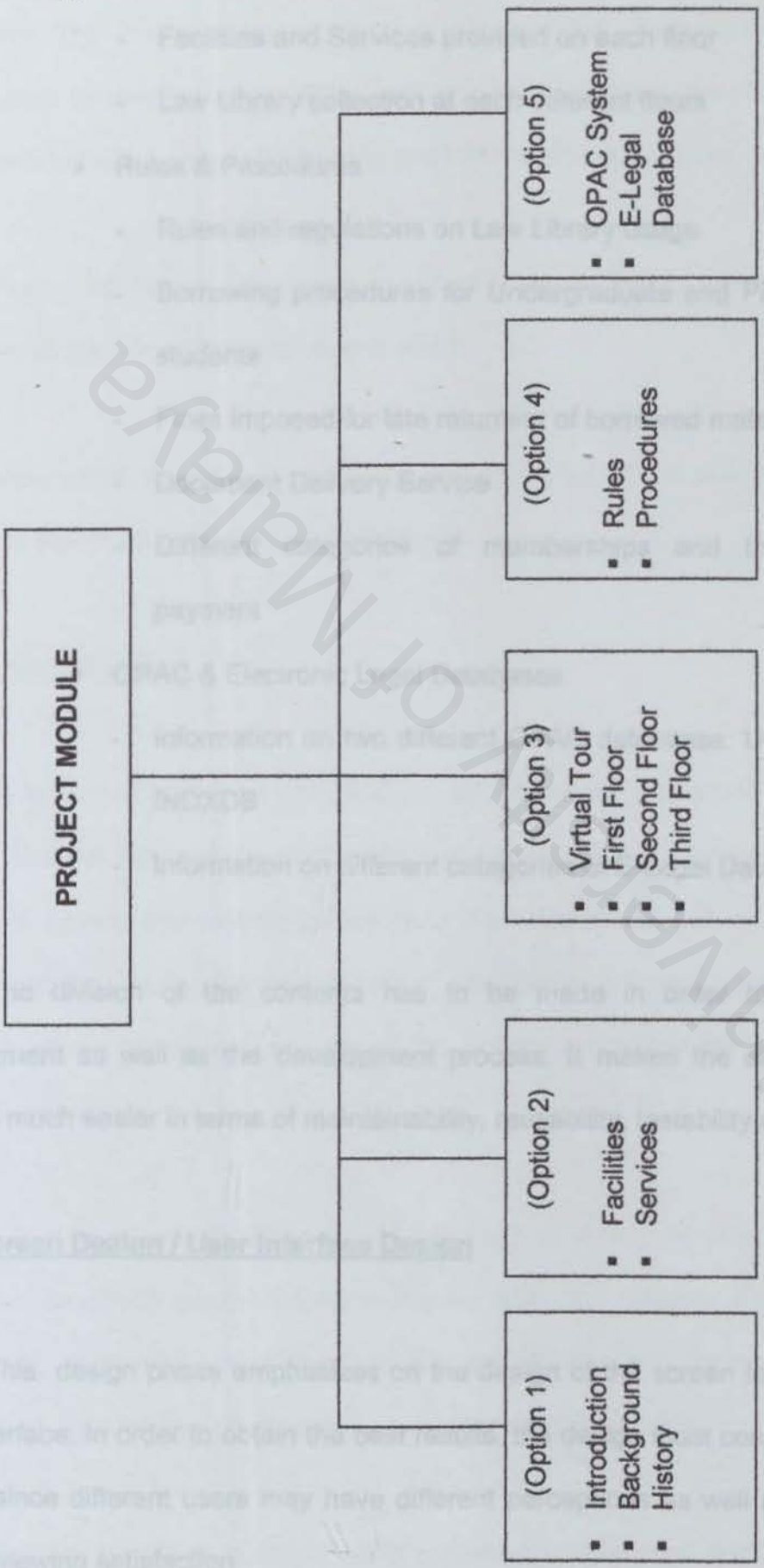
Figure 4.1: Structure Chart for User Module



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- Floor Plans of Law Library First, Second, and Third Floor
- Facilities and Services provided on each floor
- Law Library collection at each different floors

• Rules & Procedures

- Rules and regulations on Law Library usage
- Borrowing procedures for Undergraduate and Postgraduate students
- Fines imposed for late returning of borrowed materials
- Document Delivery Service
- Different categories of memberships and their annual payment

• OPAC & Electronic Legal Databases

- Information on two different OPAC databases: UNIMAL and INDXDB
- Information on different categories of E-Legal Databases

The division of the contents has to be made in order to ease the management as well as the development process. It makes the development process much easier in terms of maintainability, reusability, testability and speed.

4.2.2 Screen Design / User Interface Design

This design phase emphasizes on the design of the screen layout or the user interface. In order to obtain the best results, the design must consider many criteria since different users may have different perceptions as well as different level of viewing satisfaction.

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User interface design describes the communication between the software and users. The design is focuses on the effectiveness of the screen layout to attract users by creating a complete, easy to handle and user-friendliness layout. The interface design should be easy to understand and easy to use.

Figure 4.2 shows the screen layout of the main menu where users can select which section of information they want.

Meanwhile, Figure 4.3 shows the screen layout of the sub menu where users can select which floor they want to view.

4.3 System Modeling

A system model is a graphical model that show the boundaries of the system and the information used within the system. It is a representation of a proposed system that described the data flow throughout the structure. The model describes the points where data or information enters a system and the places it will be processed, as well as the actions taken and the points where data will be output.

A system model is documented through a variety of graphical design diagrams. Graphical design diagrams include data flow diagram (DFD), system flow charts, entity-relationship diagram, structured charts, and decision trees. For this project, system flow chart was chosen to model the system.

System flow chart is best used for system documentation and to model th

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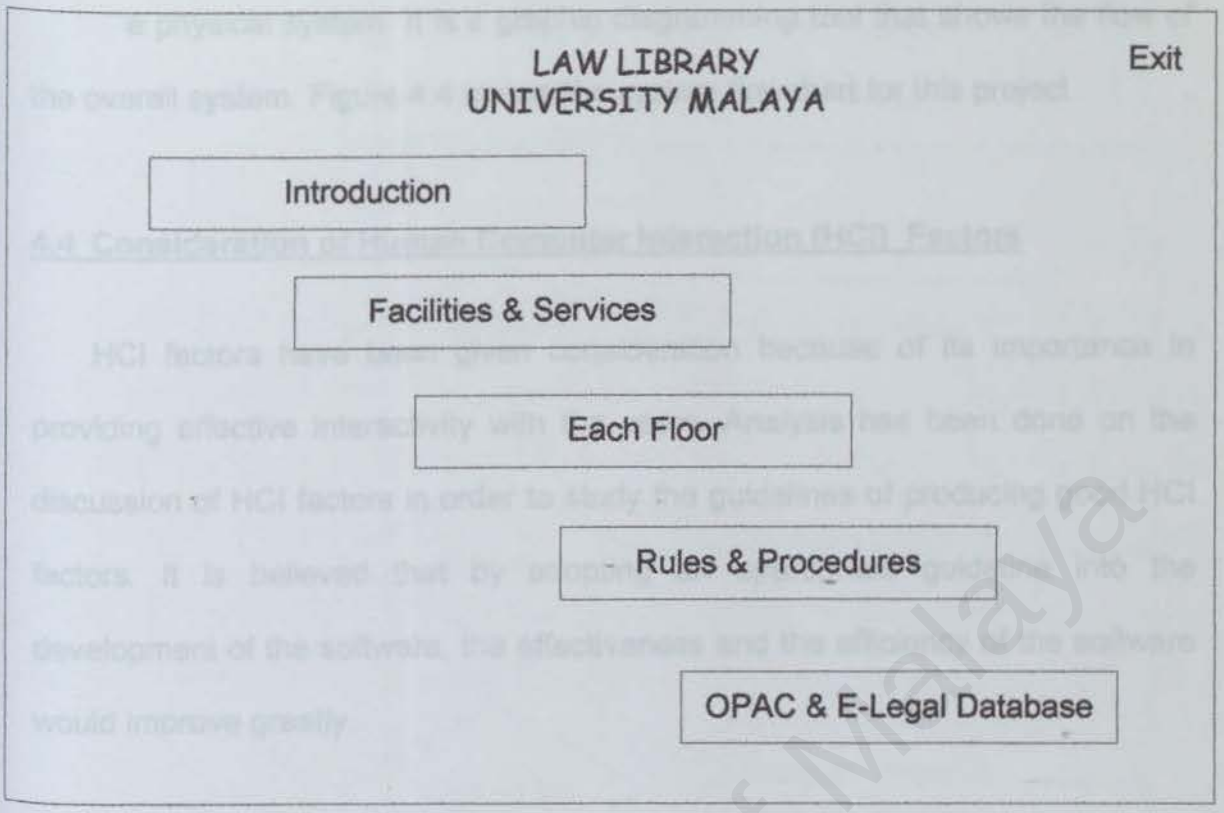

Figure 4.2: Design For Main Menu

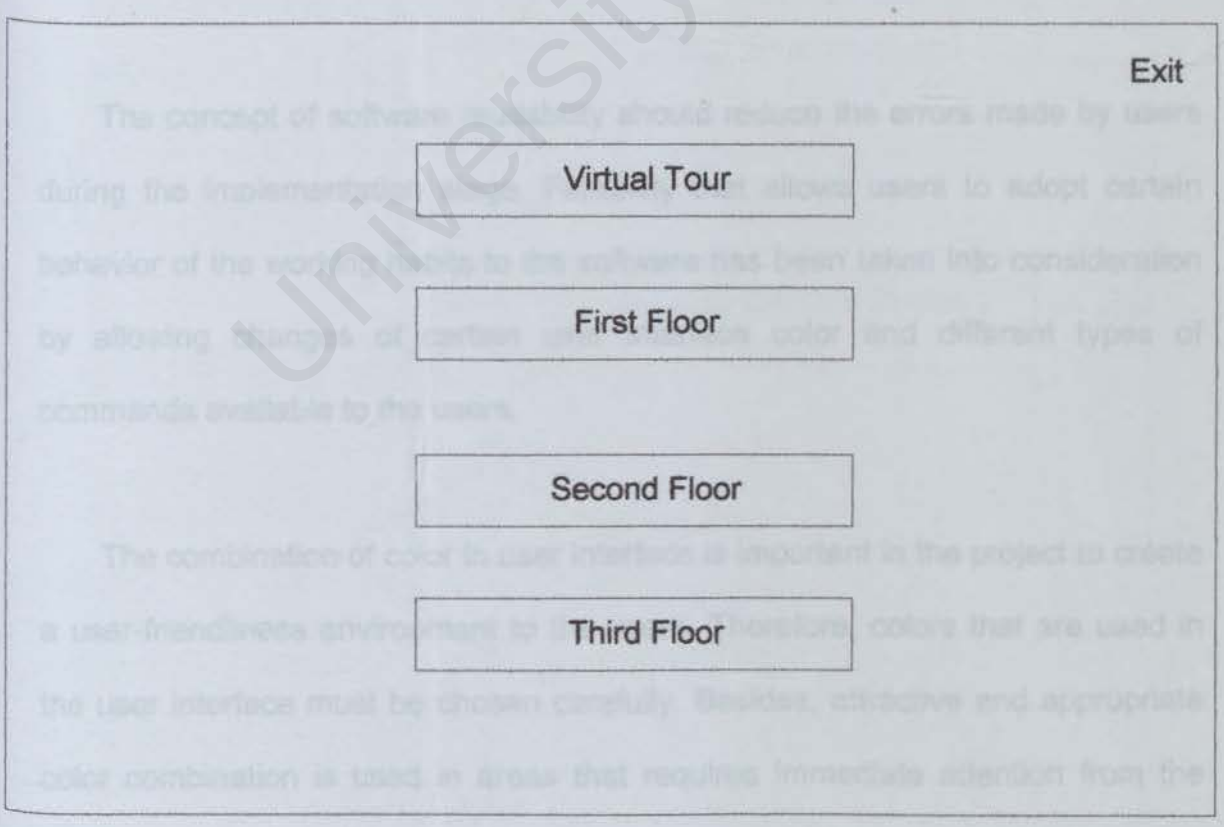

Figure 4.3: Design for Sub Menu

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e physical system. It is a graphic diagramming tool that shows the flow of the overall system. Figure 4.4 shows the system flowchart for this project.

4.4 Consideration of Human Computer Interaction (HCI) Factors

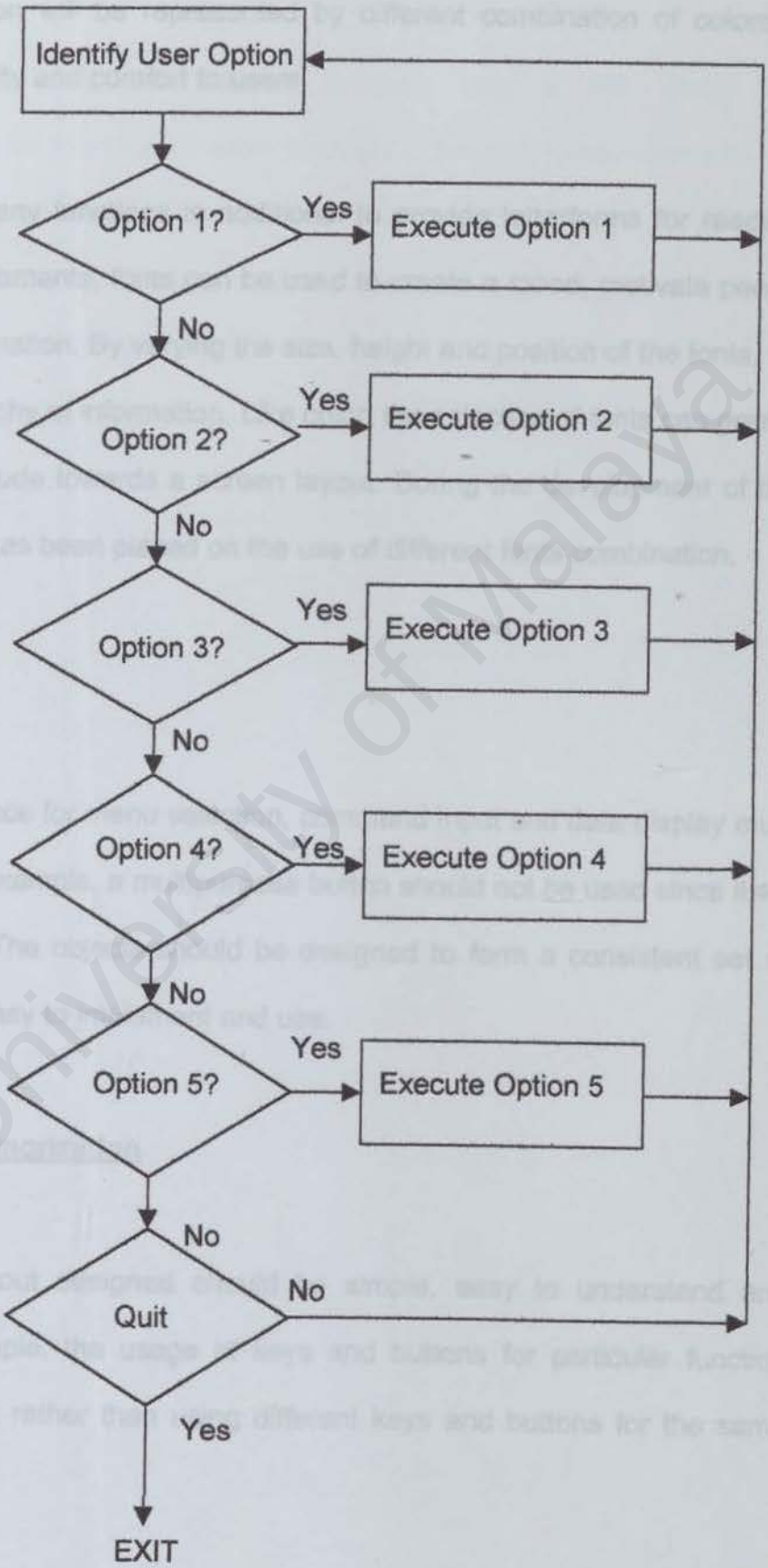
HCI factors have been given consideration because of its importance in providing effective interactivity with the users. Analysis has been done on the discussion of HCI factors in order to study the guidelines of producing good HCI factors. It is believed that by adopting an appropriate guideline into the development of the software, the effectiveness and the efficiency of the software would improve greatly.

This section of the report will focus on the HCI guidelines as well as the styles of interaction that were adopted during the design of the project.

The concept of software reusability should reduce the errors made by users during the implementation stage. Flexibility that allows users to adopt certain behavior of the working habits to the software has been taken into consideration by allowing changes of certain user interface color and different types of commands available to the users.

The combination of color in user interface is important in the project to create a user-friendliness environment to the users. Therefore, colors that are used in the user interface must be chosen carefully. Besides, attractive and appropriate color combination is used in areas that requires immediate attention from the users. Colors will be used whenever necessary for differentiation and

Figure 4.4 : System Flow Chart for Project



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identification purposes. All the titles, menus and commands as well as different kinds of information will be represented by different combination of colors to enhance the visibility and comfort to users.

Fonts have many functions in additional to provide letterforms for reading. Like other visual elements, fonts can be used to create a mood, motivate people and organize information. By varying the size, height and position of the fonts, we can create a hierarchy of information. Like color, the selection of fonts can greatly affect the user attitude towards a screen layout. During the development of this project, emphasis has been placed on the use of different fonts combination.

4.5 Consistency

The user interface for menu selection, command input and data display must be consistent. For example, a multipurpose button should not be used since it will lead to confusion. The objects should be designed to form a consistent set so that the system is easy to implement and use.

4.6 Minimizing memorization

The screen layout designed should be simple, easy to understand and attractive. For example, the usage of keys and buttons for particular function should be the same rather than using different keys and buttons for the same type of functions.

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4.7 Conclusion

Design of user interfaces should seriously take a few things into consideration such as simplicity, user friendliness, easy to understand and yet attractive. Before implementing the system, the developer should come up in mind the design of the user interface, how the appearance of the module is going to look like. A good conceptual design will make it easier for the developer to implement the system into reality.

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SYSTEM IMPLEMENTATION

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5.1 System Implementation

The system implementation phase follows immediately after the system design phase. It is the process of developing a system based on the requirements identified in the early stages. During this phase, the design model of the project will be transformed into a workable system.

5.2 System Coding

After designing the system, the following stage is the writing of the program for the real system. In this phase, the focus is on implementing the solution as a complete system. In other words, the programs that implement the design must be written carefully in order to meet the objective of the system.

There are many different ways to implement the design and many languages and tools are available in the market for the development process. Since this project is developed using the Macromedia Director 7, the scripting language associated with it is called the Lingo scripting.

All program languages allow a problem to be solved in a variety of ways. Lingo scripting is the programming language of Director 7 that allows developers to do many wonderful things in creating an interactive multimedia applications.

5.3 Coding Approach

Some of the approaches used in the coding development are listed as

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below:

- Readability

  Code documentation is important to ease the readability of a system. It begins with the selection of identifier (eg: variables & labels) names and continues with the composition and organizing the whole program.

- Naming Technique

  This is a good and meaningful technique for variables, controls and modules that provide easy identification for the program. The naming convention is created with the consistency and standardization in coding.

- Internal Documentation

  This provides a clear guideline to developers and readers about the function of a particular source code in the program. Therefore, comments provide the developer with the means of communication with other readers of the source code. The statement of function of the module and descriptive comments are embedded within the body of the source code is used to describe the processing function.

- Modularity

  The main purpose of modularity is to reduce complexity of system and to facilitate the developer to implement the system by encouraging parallel development of different parts of the system. With the approach of modularity, developer can implement all modules at the same time and does not have to wait for a particular module to complete before going into another module.

University of Malaya

5.4 Coding Style

Coding style is an important component of the source code and it determines the intelligibility of a program. An easy to read source code makes the system easier to be maintained and enhanced in future.

Listed below are some of the coding styles used during the coding phase of this project:

- Selection of meaningful identifier names (variables, forms, labels, images, pictures)
- Description and an appropriate comment written in the source code to make it easier for the readers to understand the source code.
- Indentation of codes increases the readability of the program.

5.5 Lingo Scripting

Lingo Scripting is the programming language used in Macromedia Director 7.

5.5.1 What is Lingo?

Lingo, English like programming language built in Director 7 is a powerful, object-oriented scripting language.

All the functions and keywords which are in English makes Lingo easier for users to learn. Lingo scripting adds interactivity to a movie. It can be used to control a movie in response to specific conditions and events. Most of the wonderful things that Director 7 can do involve the commands of Lingo. This

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shows that Lingo is a very powerful scripting language. In some cases, it might not be the best tool to use, but at most of the time, Lingo can be used to create a program with less effort than the traditional methods.

Lingo started out as a simple set of scripting commands used to control animation in Director 7. With the evolution of the technology, it is now a complete object-oriented language rivaling the traditional languages such as C and Pascal. There are more than 800 Lingo keywords and all standard programming language structures. This makes Lingo as powerful as the programming languages such as C++, Visual Basic and Java.

5.5.2 Lingo Scripting Basics

Some of the behaviors are created using simple Lingo scripts. There are four different types of script members that are the movie scripts, behavior scripts, parent scripts and cast scripts, which is the scripts embedded inside the cast members.

- Movie Scripts

  Movie script are available to the entire movie, regardless of which frame the movie is in or which sprites the user is interacting with. When a movie plays in a window or at a linked movie. In responding to events such as key presses and mouse clicks, movie scripts can control what happens when a movie starts, stops or pauses. Handlers in a movie script can be called from other script in the movie as the movie plays. Movie script

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might also be used to define and initialize global variables for use within your movie, and to store user-defined handlers.

- Behavior Scripts

  A behavior script is a script that is attached to sprites or frames in the score. It is sometimes referred to as a Score script, which refers to where behaviors are applied. Behaviors attached to sprites are called sprite scripts, and behaviors attached to a frame via the script channel are called frame scripts. A script might have more than one behavior script attached to it. A frame might have only one behavior attached to it.

  Whenever you attach a behavior to a sprite from the Library palette, that behavior is added to the cast. When you edit a behavior, that change takes effect in every frame and every sprite to which it is attached.

- Parent Scripts

  Parent scripts are special scripts used by Lingo to create child objects and are cast members that appear in a cast window. When a script has been specified as a parent script, its handlers have the scope of the Script window, like a behavior. It differs from a behavior in that the script does not appear in the Behavior Pop-up menu of the Behavior or Sprite Inspectors.

- Cast Member Scripts

  A cast member script is attached to the cast member, independent of the Score. A cast member can have only one cast member script attached to

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it. Cast member scripts are often used to hold `on mouseUp` and `on mouseDown` handlers, but they can have user-defined handlers as well.

5.6 Importing Bitmaps

Images, graphics, illustrations, photographs and renderings are all bitmaps, that is the arrangement of colour pixels in computer formats. Before creating a movie, all bitmaps have to be imported into Director 7's cast member. Importing bitmaps is similar to importing other types of cast members. If you import a bitmap with a color palette or depth different than the current movie, the Image Options dialog box appears. You must choose to import the bitmap at its original color depth or at the current system color depth. If you are importing an 8-bit image, you have the choice of importing the image's color palette or remapping the image to a palette already in Director 7.

Director 7 can support different types of bitmaps such as:

- BMP – Bitmapped Graphics File

  Graphic file that is native to Windows and Director 7's preferred file format for imported bitmap images on PC-compatible computers.
- GIF – Graphics Interchange Format

  Compressed bitmapped graphics file format supported by both Windows and Macintosh.
- JPEG – Joint Photographic Expert Group

  Format for compressing bitmapped graphics files supported by both Windows and Macintosh.

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- TIFF – Tagged Information File Format

  A RGB bitmap format capable of supporting up to 32-bit colour and is supported by both Windows and Macintosh.

- PCX – PC Paintbrush bitmapped graphic images

  Bitmapped graphic images supported by both Windows and Macintosh. PCX files use an 8-bit palette to represent colour in bitmapped images.

- WMF – Windows Metafile Format

  A graphic file format supported by Windows. WMF files are vector format, which means they are object-oriented rather than bitmap images.

5.6.1 Editing Bitmaps

Once the bitmap has been imported into Director 7 as a cast member, it can be edited using the Paint Window in Director 7. The Paint window has a complete set of paint tools and inks for creating and changing bitmap cast members for movies. Anything you draw in the Paint window becomes a cast member. When you make a change to a cast member in the Paint window, the image in the Cast window is instantly updated—as is the cast member wherever it appears on the Stage.

Listed below are some of the tools in Paint Window used to edit bitmap images in this project and the operation performed by the respective tools:

- Lasso

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Free-from selection tool used o select irregularly shaped areas.

- Marquee

  Rectangular selection tool used to select areas in rectangular shape.

- Paint Bucket

  Fills all contiguous pixels of the same colour and pattern with the foreground colour and pattern.

- Text

  Creates and places text into the graphic. This text can only be edited while the insertion is active; after that, it becomes part of the graphic.

- Filled Rectangle

  Paints a filled rectangle using the current foreground colour and pattern.

- Filled Ellipse

  Paints a filled oval using the current foreground colour and pattern.

- Eraser

  Paints the graphic with the selected background colour. Double clicking the button erases the whole screen.

- Brush

  Paints the graphic with the foreground colour using the selected ink.

5.7 Text Members

Text is one of the most important element in multimedia application and it is widely used in this project. Director provides many ways to add text to a movie. You can either create new text cast members within Director or import text from an outside source such as a document stored on the Internet. You can import plain text, RTF, or HTML documents. Once text is part of your movie, you can

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University of Malaya

format the text in a variety of ways using Director's formatting tools. Director offers standard professional formatting functions, including alignment, tabs, kerning, spacing, subscripts, superscripts, color, and so on. You can also create hyperlinks for any text.

Text can also be controlled from Lingo. For example, Lingo can edit the text in existing cast members, specify text formatting such as font and size, and interpret strings that users enter.

5.7.1 Editing Text

On the most powerful feature in Director 7 is its capability to edit the text members. Director offers a number of ways to edit and format text. You can edit text directly on the Stage and format it with the floating Text Inspector, or use the Text window to work in a more traditional text editing environment. Many of the same formatting controls are in the Font and Paragraph dialog boxes as well as in the Text window and the Text Inspector. Developer can choose the most convenient option for their work style.

Once users have created text cast members for the movie, users can format them in a variety of ways: reset the font, style, size, spacing, and color. This procedure uses using the Font dialog box, but many of the same controls are available in the Text Inspector and the Text window.

University of Malaya

5.8 Sound Members

Sounds add another dimension to your Director movies. Apart from putting dazzle into a movie, it can fulfill one of the key concept in multimedia application, that is to provide information in a format that maximizes the impact of the multimedia presentation.

Director 7 supports a variety of digitized sound formats that users can use to enhance their movies. Director 7 supports WAV (Waveform Audio File) sounds, MP3 (MPEG 1 Layer 3), AIFF (Audio Interchange File Format), QuickTime Audio, Macintosh sounds and also RMF (Rich Music Format) files which is created using the Beatnik Xtra and controlled by Lingo. For best results, use sounds that have 8- or 16-bit depth and a sampling rate of 44.1, 22.050, or 11.025 KHz.

In this project, the audio files used in the movie are all in WAV form. One problem encountered during the playback of a movie is that when a user want to jump to another movie, the sound in the current movie keep on playing in the new movie until it reaches the last frame of the sound cast member. This means that the sound in previous movie will overlap into the new movie. To overcome this problem, a Lingo command is added to the Exit button to stop the current sound. By this way, whenever a user click on the Exit button to jump to another movie, the sound playing in current movie will stop. The Lingo command for this purpose is shown as below:

```
on mouseDown
   go to movie "ray1.dir"
```

```
    puppetSound 1, 0
end
```

5.8.1 Importing Sound Members

Director handles sounds as either internal or linked. You determine whether a sound is internal or linked when you import it. Each type of sound has advantages for different situations.

Director stores all the sound data for an internal sound cast member in a movie or cast file and loads the sound completely into RAM before playing. After an internal sound is loaded, the sound plays very quickly. This makes internal sound best for short sounds that recur frequently in your movie, like beeps or clicks. For the same reason, making a large sound file an internal sound is not a good choice, since the sound may use too much memory.

Director does not store sound data in a linked sound cast member. Instead, it keeps a reference to a sound file's location and imports the sound data each time the sound begins playing. Because the sound is never entirely loaded into RAM, the movie uses memory more efficiently.

Also, Director streams linked sounds, which means it begins playing the sound while the rest of the sound continues to load from its source, whether on disk or over the Internet. This can dramatically improve the downloading performance of large sounds. Linked sounds are best for longer sounds like audio-narration or non-repeating music.

University of Malaya

5.9 Summary

Lingo Scripting is the programming language of Director 7. With Lingo, users can add many wonderful things to a Director movie.

Before the creation of a movie, bitmaps are imported into Director 7 as a cast member. These images can come in many formats such as GIF, JPEG and BMP. Users can use the Paint Window in Director 7 to edit the images before they are integrated as a movie.

Like bitmap, text created in external tool can be imported into Director 7 as a cast member. Besides, users can create their own text member using the Text tool provided in Director 7. Users can manipulate the text by changing the font, style, size, and colour of the text.

Director 7 supports various kinds of sound files such as AIFF, WAV, MP3 and RMF. Users can add sounds into Director movie by either import the sound files into a movie or link the sound to an external location of the sound files.

5.10 Conclusion

Developers have to take into consideration few things before writing the coding of a system:

- Use the design aspect to determine an implementation language for coding. For this project, Lingo scripting is used since the chosen authoring tool is Macromedia Director 7.

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- Use the concept of reusability to save the implementation time.
- Preserve the quality of the design attributes in the coding.
- Use comment and other documentation in the coding to enhance readability and understandability of the coding to the users.

University of Malaya

System Testing

University of Malaya

6.1 System Testing

System testing is a critical element of software quality assurance. It is required to ensure that the system is developed according to its specifications and in line with the users' requirements and expectations. Testing is not the first place where faults finding take place but it is focused on finding faults and errors. There are many ways to increase the effectiveness and efficiency of the testing efforts, which will be discussed later in this chapter.

Failure of a system can be the results of several reasons:

- The specification may be wrong of have missing requirement and do not state exactly what the customer needs.
- The specification may contain a requirement that is impossible to implement by the given prescribed hardware, software and resources.
- The system design phase may contain fault or error that carried forward to the implementation phase.
- The program code may be wrong. Perhaps the algorithm is implemented improperly.

Fault identification is the process of determining what fault causes the failure of the system. The fault correction or removal is the process of making changes to the system so that the fault can be removed. (Pfleeger, 1998)

University of Malaya

6.2 Types of Testing

In the development of a large system, system testing usually involves several stages. In general, there are three types of testing performed on a system (Pfleeger, 1998). The three testing are:

- Unit Testing
- Module Testing
- Integration Testing

All of these three testing are performed on the project to check for any faults and to correct the faults to ensure that the system work successfully.

6.2.1 Unit Testing

Unit testing, also known as component testing is the first stage in system testing. Each component in the project is tested on its own, isolated from the other component in the system. The purpose of this testing is to verify that each of the component functions properly as planned.

This process enables the developer to detect errors in coding and logical mistakes that are within the boundary of the module. Besides, interactions between different parts are not allowed to avoid confusion.

In this project, each part of the movie is tested individually to detect any possible errors. Unit testing is conducted by testing each button of every

University of Malaya

separate page to determine whether it worked as planned. Each of the buttons is programmed to have several behaviors such as changes of cursor when the mouse rollover or jump to another Director movie when the mouse is being clicked.

6.2.2 Module Testing

Module testing is performed after completion of the unit testing. In module testing, each module or section is tested as an independent component.

6.2.3 Integration Testing

After the individual component are tested and are working properly, the next step is to ensure that the interfaces among the component are defined and handled accordingly. Integration testing is the process of verifying that the system component work together as described in the system and program design specification (Pfleeger, 1998).

There are four approaches used in Integration testing:

- Bottom-Up Integration

  This is a popular approach used for merging the components together to test it in a larger system. When using this method, each component at the lowest level of the system hierarchy is tested individually first. Then, the next component tested are those that called the previous

University of Malaya

components. This approach is followed repeatedly until all components are included in the testing.

- Top-down Integration

  This approach is the reverse of the bottom-up integration approach. In this method, the top level module, usually the one with the controlling function is tested by itself. Then, all components called by the tested components are combined and tested as a larger system. This process is reapplied until all components are integrated.

- Big-bang Integration

  In this approach, all the components are tested individually and are combined to test as a final system to see whether the system function as it is planned. However, this approach has several disadvantages and is not recommended. This is because, when all the components are merged together at once, it is difficult to find the cause of the failure is the system doesn't work.

- Sandwich Integration

  This approach is the combination of bottom-up and top-down strategy. Here, the system is viewed as three layers, like a sandwich with the target layer in the middle, the level above the target and the level below the target. Sandwich integration allows integration testing to begin early in the testing process. It also combines the advantages of top-down approach with the bottom-up approach. However, it does not test the individual component thoroughly before system integration.

University of Malaya

6.3 Summary

System testing is important to ensure that the system runs according to its specification and in line with the users' requirements and expectations. There are several reasons that cause the system failure. One of the important reason is the faulty in the program code or system design.

Testing phase can be categorized into three types that are the unit testing, module testing or integration testing. Each phase of testing plays an important part in the process of system testing.

6.4 Conclusion

Different techniques are used to test the individual component and the integrated system. The goal of testing is to find the fault that caused the failure of the system. The absence of fault does not guaranteed correctness of the system.

There are manual and automated techniques to assist in finding the fault in codes, as well as testing tools to keep track how much has been tested and when to stop the testing.

University of Malaya

SYSTEM EVALUATION

University of Malaya

7.1 System Evaluation

System evaluation is the process of identifying system's strengths and limitations and the possible enhancements of the system in future. One of the purposes of system evaluation is to show the effectiveness and efficiency of what has been done on the system. It also enables the developers to evaluate the knowledge gained during the development process.

The evaluation techniques used are similar to those in other discipline where measurement of key aspects of the products, processes and resources has to be taken into consideration and the information gathered can be used to determine whether the goals have been achieved for the productivity, performance, quality and other desirable attributes of the system (Pfleeger, 1998).

7.2 Approaches to System Evaluation

There are few approaches used to evaluate the system:

- Client / User Evaluation

  The final CD package is shown to Ms.Ratnawati from the Law Library to be evaluated. Overall, she is impressed and said that the presentation package is good and is suitable for the Law Library usage. However some minor changes have to be done. Most of the changes are on the information itself since some of the information is not up-to-date. Some new information is needed to be added to certain parts of the package. Because of time constraint, all these changes will

University of Malaya

be done later and the latest and newest version of the package will be sent to the Law Library.

- Feature Analysis

  This is the simplest type of evaluation used to rate and rank the attribute of various aspects of a system.

- Case Study

  In this approach, key factors that may affect an activity outcome is identified and documented for further review and enhancement.

- Survey

  This is a retrospective study used to document relationships and outcomes in a given situation of a system.

- Formal Experiment on End-users

  In this approach, values of independent variables are manipulated and changes in dependent variables are being observed to determine whether the changes in the input affect the changes in the output.

7.3 Problems Encountered and Solutions

Various problems were encountered during the development of this project where the problems may arise from hardware, software, lack of resources and others related factors. However, all these problems were tackled properly in order to complete the project successfully.

University of Malaya

7.3.1 Lack of knowledge and reference resources in Macromedia Director 7

Although Director 7 is a powerful authoring tool, certain levels of understanding is important in order to use the software efficiently. Since I had never really used Director 7 before, I had to learn it and because of time constraint, I had to do both at the same time, that is learning Director 7 and Lingo scripting as well as develope the system parallely.

It is difficult to locate the reference resources on Director 7 in the University's Library. During the learning and development process, most of references are obtained from the help file in Director 7, online help, Director 7 and Lingo reference book and advice from friends.

7.3.2 Difficulties in organizing all the information

There were a lot of information gathered on this project. In the beginning, I was having difficulties in organizing all the information in creating a comprehensive and compact presentation package. I had doubts on which kind of information is needed for the audience.

However, after a few meetings with Ms. Ratnawati, the librarian in the Law Library, I had a clearer view of what kind of information is needed for this project and how to organize all the information in a systematic sequence. Therefore, I had divided the project into five different sections:- Introduction, Facilities & Services, Each Floor, Rules & Procedures, and Opac & E-Legal Databases.

University of Malaya

7.3.3 Limitations of font support in Director 7

Director 7 has a limitation of font support and most of the fonts created in Director 7 are in a 2-dimensional view which is less attractive.

To overcome this problem, some of the fonts are created in other tools such as Photoshop and Microsoft Word and then imported into Director 7 as an image file.

7.3.4 Difficulties in taking photos for the Virtual Tour

In order to develop the Virtual Tour using the Ulead COOL 360, a lot of photos have to be taken. In the process of taking the photos, I must choose the best spot in order to capture most of the view in the Law Library. Initially, I had used my own camera to take the photos without using a tripod. The photos came out badly due to unprofessional camera usage and without the usage of the tripod.

To overcome this problem, I had to take the photos for a second time. This time, I had borrowed my friend's camera and tripod. Besides, I had asked my friend to help me take the photos. Before taking the photos, I tested a few spots to see which one would capture the best view.

7.3.5 Difficulties in editing photos

During the development of the project, a lot of scanned images and real photos were used which were difficult to edit in the Paint Window available in

University of Malaya

Director 7. It is hard to adjust the brightness and contrast of each photo at the same level.

To overcome this difficulty, a more professional editing tool such as Photoshop 5.0 was used. The brightness and the contrast of the photos can be modified with less tedious effort by using the Microsoft PhotoEditor 3.0 which has a scale on the adjustment of brightness and contrast.

7.3.6 Lack of facility in audio recording

Audio narration plays an important element in this project where part of the information is delivered in audio form. A good quality audio narration is vital to ensure a successful project. However, there is no adequate audio recording facility found in our faculty of elsewhere in University Malaya. I had tried my best in other places but the best I got is just a sound proof room with no recording facilities.

As a result, I had to do the audio recording using my own personal computer. I did the recording at night when the environment was quieter. In order to improve the quality of the sound, I had used an audio recording software called CoolEdit 2000 that provide the facility to filter and reduce the noise of the recorded audio file.

7.3.7 Overlapping of audio sound

When a user want to move to another movie during the playback, the sound

University of Malaya

in the current movie keeps on playing in the new movie until it reaches the last frame of the sound cast member. As a result, the sound in previous movies would overlap with the new movie.

In order to overcome this problem, a Lingo command is added to the Exit button to stop the current sound. Through this way, whenever a user clicks on the Exit button to move to another movie, the sound playing in the current movie will stop. The Lingo command for this is shown below:

```
on mouseDown
  go to movie "ray1.dir"
  puppetSound 1, 0
end
```

7.3.8 Choosing a suitable audio sound format for the project

During the audio recording process, I had saved the audio files in MP3 format since this requires smaller storage. However, when I linked the audio files externally into Director 7 movie, the audio files were unable to play right to the end. After a series of testing, I was still unable to determine the factor that caused this problem.

In a trial and error effort, I converted the audio files into WAV format and linked them again into the movie. Surprisingly, it worked!

University of Malaya

7.4 System Strengths

Even though many problems were encountered during the development of this project, it has it own strengths and uniqueness:

- User friendly and attractive interface

  Since the target audience of this package is the Law faculty students, all the interfaces are designed carefully in order to create a set of interfaces with emphasis on user-friendliness, attractive, simple and easy to understand.

- Multiple choice information

  All the information in this project is divided into five parts and users can select which part of the information they want to view.

- Compact and comprehensive information

  This package includes a set of compact and comprehensive information that provides the students sufficient information on the usage of the Law Library.

- Easy storage and retrieval

  This project is a CD-based package which makes it easier to be stored and retrieved.

University of Malaya

7.5 System Constraints

Due to time factor, hardware, and software limitations, there are some constraints on this project. These include:

- Decrease in audio quality

  Due to lack of facilities in audio recording, all the audio narration used in this project was recorded in a normal room environment. This results in the decrease of the quality of the audio.

- Lack of animation

  Most of the images used in this project are real photos which makes it difficult to animate the movement of the photos. Because of this, only simple animation is used.

7.6 Future Enhancements

Since this system is a multimedia presentation package delivering updated information on the Law Library, future enhancement can be added to update the presented information to provide the latest and newest information on the Law Library to the students.

Now, there are five different sections of information which student can choose to view. In future, additional sections can be added to create a more sophisticated, comprehensive and interactive presentation package.

University of Malaya

7.7 Knowledge and Experience Gained

Through the development process of this project, I had discovered a lot of new things, for example, new problems occurred in every different stages of the development. In order to overcome the problems and difficulties, I had to find solutions using several ways such as through the reference books and the Internet.

Throughout the development, I had gained a lot of experiences. Apart from learning how to use different kinds of software, it was also very challenging to develop a system in a time constraint manner. Consequently, this had taught me to build up self confidence, self discipline and time management.

Before developing this system, I learnt to plan the project accordingly using the concept of project management such as how to allocate time properly for each development stage and how to plan a proper documentation work for easier review. To increase the success rate of the system, I had set deadline to complete each sub-module at a particular planned time. Besides, I had also learnt how to cope with stress when meeting the deadlines.

7.8 Summary

The evaluation on the completed system is done on the system strengths and system constraints. There are a few approaches used in the system evaluation. One of the popular and efficient approach is experimenting the system on chosen end users. Different kinds of problems which arises either

University of Malaya

from hardware, software or lack of resources are faced during the development stage and various solutions are implemented carefully in order to overcome these problems.

Limited enhancement can be done on the system since this is a information presentation package. The possible future enhancement is to update the information in the package.

Throughout the development of this project, I had gained a lot of knowledge and experience which made me into a better individual.

7.9 Conclusion

At this stage, the development of the system had completed successfully. Although the system had fulfilled all the requirements and met the objectives, there are still some limitations on the system. On other words, the system has its own strength and ability as well as its own limitation.

The most efficient evaluation for this system is from the targeted viewer itself, that is the group of law students who will be using the Law Library.

University of Malaya

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19. Macromedia Director FAQ

(http://www.mcli.dist.maricopa.edu/director/faq/index.html)

20. Human Behavior in Receiving Information

(http://www.hughes.net/~scheper/psyc.htm)

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APPENDIX

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User Manual

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Table of Contents

List of Figures

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About the manual

This manual is to help users in using the "Introduction to the Law Library" package. It is divided into few parts to provide a easier reading manual:-

- Part 1: Introduction
- Part 2: Hardware and Software Requirements
- Part 3: Getting Started
- Part 4: Main Menu
- Part 5: Inside the Movie
- Part 6: Exiting

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Part 1: Introduction

This 'Introduction to Law Library" is an attractive, interesting and interactive multimedia CD-based presentation package created using Macromedia Director 7. The goal of this project is to provide information about the Law Library to the students during their orientation week.

Information provided in this package consists of features such as background and history, location, floor plan and operation hours, library collection, library facilities, services, memberships, and rules and regulations, information on CD-ROM database and introduction to OPAC System, as well as borrowing, returning and booking procedures, and the fine system according to different kinds of memberships.

Generally, there are five sections of information in this package:- Introduction, Facilities and Services, Each Floor, Rules and Procedures, and OPAC and E-Legal Databases. Users can choose which part of information they want to view.

Part 2: Hardware and Software Requirements

Hardware required to run the system:

- PC with 133Mhz processor / higher speed
- Min 16MB RAM (for better performance 32MB recommended)

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- Hard disk with recommended of 150MB of free space
- SVGA graphics adapter
- SVGA monitor
- Sound card
- Speaker
- Mouse
- Keyboard
- CD-ROM drive (minimum 8X)

Software required to run the system:

- Operating System – Windows 95/98/2000
- Quick Time 3.0 (/ or higher) movie player

Part 3: Inside the CD

Listed below are the files included in the CD-ROM:

- An executable movie file : **LawLibrary.exe**
- QuickTime 3.0 installer
- A Quick Time movie Virtual Tour : **VR.mov**
- A folder consisting all the audio files of the movie
- User Manual Document : **UserManual.doc**

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Part 4: Getting Started

Follow the steps below to get started on the package "Introduction to Law Library":

- Insert the CD-ROM into your CD-ROM drive
- Go to Start>Windows Explorer or just click on My Computer icon
- Select d:\ (D drive)
- Double click on the file "LawLibrary.exe" to start the program
- No installation required

The QuickTime movie player is required in order to view the Virtual Tour. Users can install the QuickTime 3.0 from the CD-ROM if they do not have the software. To install QuickTime 3.0, just double-click on the application setup file and follow the step-by-step instructions.

Part 5: Main Menu

Figure 2 shows the main menu of the package. As shown in the image below, there are five information selection which are the **Introduction, Facilities & Services, Each Floor, Rules & Procedures, and OPAC & E-Legal Database.** Users can click on any option they want to view.

Located at the top right of the screen is the **Exit** button. Users can click on the **Exit** button on every screen to return to Main Menu when they had finished viewing one part of the information.

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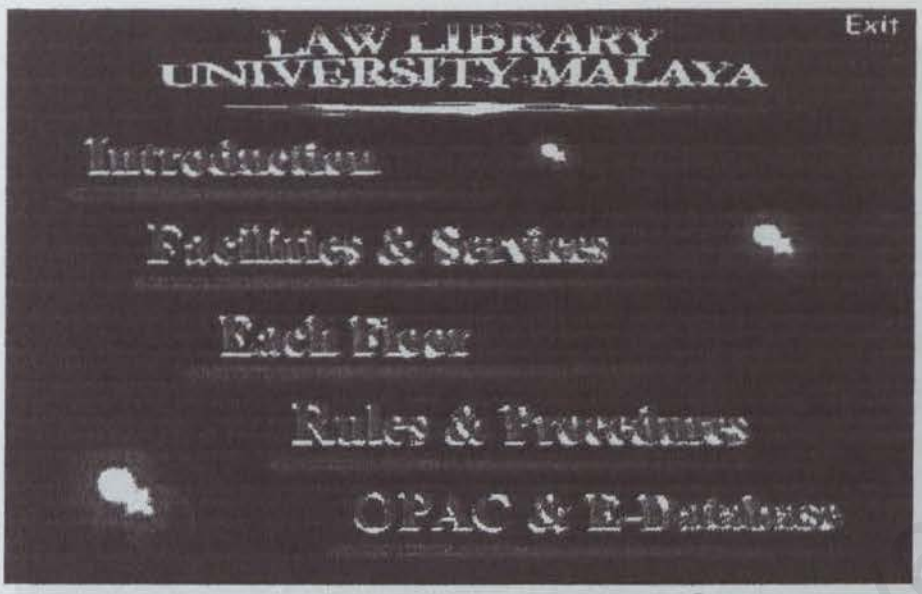

Figure 1: Main Menu

Part 6: Inside the Movie

From the Main Menu, users will be linked to different sections of information. In the third section of the information which is the Each Floor section, users will be linked to another sub menu, as shown in Figure 2. There are four selections in this sub menu:- **Virtual Tour, First Floor, Second Floor,** and **Third Floor**. When users click on the **Virtual Tour**, they will be linked to a virtual movie on the ground floor of the Law Library. Meanwhile, when they click on **First Floor, Second Floor, or Third Floor**, they will be linked to the floor plan of the respective floor. On each floor, users will be given an audio narration of the Law Library collections, as well as the facilities and services provided.

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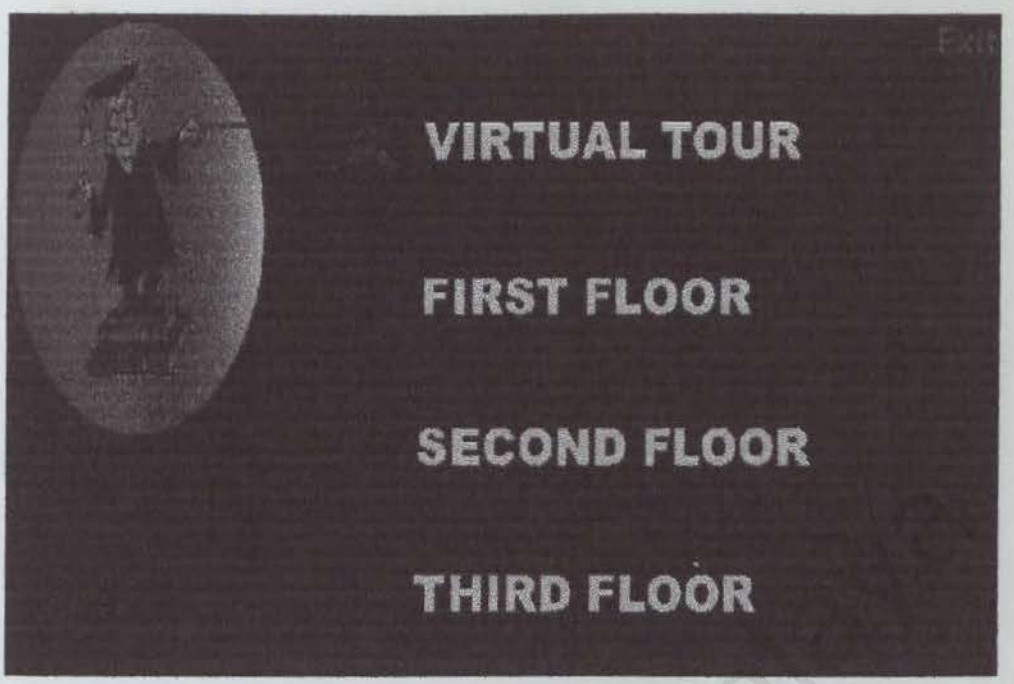

Figure 2: Sub Menu

Part 7: Exiting

Users can exit from the program by clicking the **Exit** button located at the top right of each screen.

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